

## ABSTRACT OF THE DISCLOSURE

A reactor for CO control having a reactor vessel having a water-gas shift catalyst zone, a mixed catalyst zone downstream of the water-gas shift catalyst zone, and a methanation catalyst zone disposed downstream of the mixed catalyst zone, at least one water-gas shift catalyst disposed in the water-gas shift catalyst zone, at least one methanation catalyst disposed in the methanation catalyst zone, and a mixture of the water-gas shift catalyst and the methanation disposed in the mixed catalyst zone.